

Amoeba Sisters | Video Recap

NAME: _____

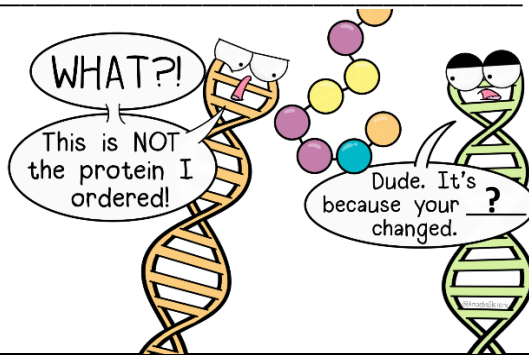
Amoeba Sisters Video Recap: Mutations (Updated)

1. What is a **mutation**?

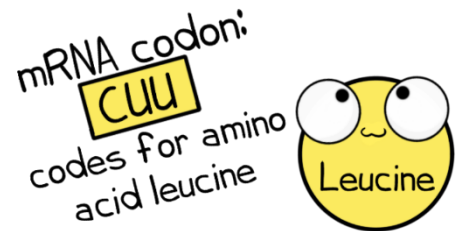
Mutations can be harmful, helpful, or neutral in their effect. A **silent mutation** tends to have a neutral effect as it does not result in coding for a different amino acid. Using your mRNA codon chart, give another mRNA codon that this CUU could mutate to and *still* code for leucine.

2. A specific part of a **nucleic acid** (such as DNA or RNA) experiences a mutation that could lead to a different protein produced. View the illustration below of DNA. Which part of the DNA experiences the mutation?

3. On the DNA illustration, draw an *arrow* to show *where* the answer to #2 could be located.

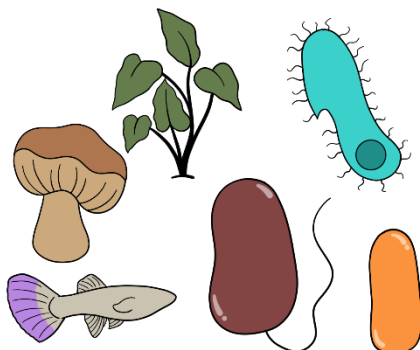


4. The mRNA codon CUU could mutate to **C_____** and *still* code for leucine, which would not change the amino acid.



5. Which type(s) of organism(s) can experience a mutation? Mark any that apply.

- _____ Animals (this includes humans)
- _____ Archaea
- _____ Bacteria
- _____ Fungi
- _____ Plants
- _____ Protists



6. Even a **gene mutation** that is a **point mutation**, meaning it affects one nucleotide base, can still make a major change

Consider the below information for normal hemoglobin:

PORTION OF HEMOGLOBIN DNA	GGA CTC CTC
MRNA	CCU GAG GAG
AMINO ACIDS	Proline-Glutamic Acid-Glutamic Acid

Sickle Cell Anemia is caused by a point mutation known as a **substitution**. Show what would occur *if* the *first* T (“thymine”) DNA base in the portion shown above experienced a mutation with a substitution of A (“adenine”).

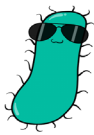
Sickle Cell Hemoglobin:

Portion of mutated hemoglobin DNA: _____

mRNA: _____

Amino Acids: _____





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7. An **insertion or deletion** can result in a **frameshift mutation**. To demonstrate this, complete the following.
Note: You will need a codon chart.

Normal Strand:

DNA: GCA ATG CAC

mRNA: _____

Amino Acids: _____

Deletion (causing a frameshift):

Taking out the first "G" in the original DNA above results in:

DNA: CAA TGC AC

mRNA: _____

Amino Acids: _____

How did the frameshift change the amino acids?

8. Check your understanding! Mark any that are *correct*.

_____ Mutations are random.

_____ Mutations are mostly beneficial and useful for an organism.

_____ Mutations can occur in both DNA and RNA, which are **nucleic acids**.

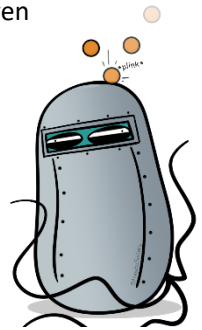
_____ Mutations can only occur during **interphase**.

_____ Not all genes code for proteins.

_____ Not all genes are "turned on" at a given time.

_____ **Substitution** mutations typically result in a **frameshift mutation**.

_____ Mutations can be **genetically inherited**.



Chromosome Mutations



Sketch It!

Create illustrations to show the following chromosome mutations. Note: Chromosomes exist in both prokaryotic and eukaryotic cells, but prokaryotic chromosome structure tends to be very different from eukaryotic chromosomes.

9. Duplication

10. Deletion

11. Inversion

12. Translocation

